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A Global Perspective on Germplasm Exchanges

Harold E. Kauffman

Food crops originated in different parts of the world. As crops became a part of domesticated agriculture, they gradually spread outside their centers of origin. For example, rice, wheat, and corn, the three major food cereals, originated in Asia, the Middle East, and Central America respectively. Soybean, the world's leading oilseed and legume crop, originated and was first domesticated and used as a food in China about 5,000 years ago.

Soybean spread to Japan before the eighth century and into Southeast Asia before the sixteenth century. Soybean was introduced into Europe and North America in the eighteenth century but did not become a major crop until the twentieth century, when efficient oil extraction processing methods were developed and the demand for animal feed provided a market for the meal.

The genetic diversity of any crop is greatest at its center of origin, where genetic variability is introduced through natural outcrossing or mutations during each growing season. Therefore, over many growing seasons, thousands of genetically diverse plants have evolved.

During these many centuries, farmers have selected and grown plants with certain traits for specific food qualities, plant stature or duration, or tolerance to biological and environmental stresses. Many relatives to cultivated plants were not domesticated but continued to grow wild at or near the centers of origin.

In the early twentieth century, new scientific breeding methods permitted the planned manipulation or concentration of certain genetic traits into relatively few cultivars. These cultivars had higher yield potential and, in some cases, better resistance to biological and environmental stresses than the traditional, or landrace, cultivars. As farmers began to grow these few varieties, many of the landrace cultivars were threatened with extinction.

Collecting and preserving germplasm. In the early twentieth century, the U.S. Department of Agriculture (USDA) sent scientists overseas to collect seed that would broaden the diversity of cultivars available to U.S. scientists and farmers. In 1950, the USDA initiated the development of a comprehensive germplasm preservation system for crops traditionally grown in the United States.

During the last three decades, the global effort to collect and preserve germplasm of the major food crops has been spearheaded by the International Agricultural Research Centers (IARCs), supported by the Consultative Group for International Agricultural Research (CGIAR), and the United Nations Food and Agricultural Organization (FAO). The CGIAR and FAO established the International Board for Plant Genetic Resources (IBPGR) in 1974 as the coordinating body to work with national and international organizations on collecting and preserving germplasm. The IBPGR germplasm network now has more than 100 gene banks responsible for preserving various agricultural crops.

Status of soybean germplasm. Many of the soybean cultivars grown in the United States are based on germplasm collected in northeast China in the late nineteenth century and the early part of this century. Subsequent collections and exchanges with Korea, Japan, Taiwan, and several other countries have broadened the genetic base of the U.S. soybean industry.

Since China began opening relations with the outside world two decades ago, some additional soybean germplasm has been obtained from China. With the help of the Rockefeller Foundation, China has built a modern national gene bank in Beijing. In 1987 for the first time, China began transferring its soybean germplasm from the provinces to the long-term storage facility in Beijing. More than 17,000 cultivated soybean accessions and 5,000 wild soybean accessions are now in the gene bank. Many of these accessions are likely to have useful genes that can supplement those already in the U.S. collection.

Germplasm networks in the "green revolution." During the past three decades, the International Rice Research Institute (IRRI) in the Philippines and the International Center for Maize and Wheat Improvement (CIMMYT) in Mexico served as the catalyst for the "green revolution," which doubled the production and yields of rice and wheat in many developing countries. The "green revolution" was successful because participating scientists could systematically evaluate and freely use all of the world's best rice and wheat germplasm.

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IRRI's gene bank now has more than 80,000 accessions of rice. Some 100,000 accessions of wheat are stored in gene banks at CIMMYT and in several other repositories managed by national programs. IRRI and CIMMYT also coordinate global networks, in which scientists from 75 to 100 countries regularly work together to make crosses, screen germplasm for special traits, and evaluate the adaptability of advanced breeding lines to a broad range of environmental conditions. This cooperation has resulted in the rapid development of cultivars with high yield potential, a wide range of maturities, resistance to biological and environmental stresses, and improved grain quality, to mutual benefit of farmers and consumers worldwide.

Importance of soybean germplasm exchanges with China.

Unlike the mandates for rice, wheat, and most of the other food crops, none of the IARCs has a global mandate to collect, preserve, systematically characterize, and use soybean germplasm. Although China has participated openly and actively as a partner in international germplasm networks for other food crops, the Chinese have had neither the incentive nor the international financial support to cooperate in soybean research with other countries on a multilateral basis.

Only small bilateral programs on soybean have been developed with a handful of countries. Therefore, a long-term collaborative research program on soybean germplasm between China and the United States is of paramount importance to both countries.

If adequate funds are available to support this program over a number of years, it will bring economic benefits to growers, processors, and consumers in the United States and China. It will help maintain the competitiveness of soybean in the world markets for protein meal and edible oil. It also will provide the opportunity for soybean to play an increasingly important role in meeting the food demands of health conscious Americans and in improving the nutrition of millions of people in developing countries.

Harold E. Kauffman was serving as director of the International Soybean Program (INTSOY) at the University of Illinois when this article was written. He is currently on a two year change of assignment and location in India as leader of the Genetic Resources Project with Winrock International. Initially with the International Rice Research Institute in the Philippines and later with INTSOY, Kauffman has more than 15 years of direct experience working with China.

International Activities

Karl E. Weingartner, INTSOY, spent April 27 to June 7 traveling to Egypt, Kenya, Zimbabwe, Republic of South Africa, Zambia, and Italy. During his trip, he finalized plans for a major soybean utilization project in Egypt. Weingartner also conducted planning for collaborative research projects and made arrangements for several participants to attend the annual INTSOY short course, "Soybean Processing for Food Uses."

During mid-May, **Raymond M. Leuthold**, Agricultural Economics, was in Paris, France, to present a paper at the World Bank Conference. He also visited markets and exchanges in Paris and in several locations in Eastern Europe.

James B. Sinclair, Plant Pathology, traveled to England, Scotland, and the Shetland Islands from June 18 to July 3. He presented an invited paper at the Symposium on Pest Management in Soybean and visited several agricultural research units.

Lowell D. Hill, Agricultural Economics, spent May 11 and 12 in Paris, France, for a meeting of the International Committee of the Transportation Research Board under the auspices of the National Academy of Science. From May 17 to 19, Hill traveled to Oxford, England, to present a paper to the International Agribusiness Marketing Association. This group brings together government, academic, and industry representatives specializing in management of agricultural enterprises.

Roderick I. Mackie, Animal Sciences, was in the Republic of South Africa and Zimbabwe from June 22 to July 27. Mackie visited the Animal and Dairy Science Research Institute and the Veterinary Research Institute in Pretoria, South Africa; the University of Natal, Pietermaritzburg, South Africa; and the University of Zimbabwe, Harare, Zimbabwe. During his trip, he discussed research, presented seminars, initiated collaborative research projects, and interviewed prospective graduate students.

Ronald J. Feltes, **Lawrence B. Schook**, and **John F. Lockwood**, Animal Sciences, will travel during July and August to Budapest, Hungary, to attend the World Congress of Immunology. They also will visit the Ludwig Institute of Cancer, Lausanne, Switzerland. Schook also will attend scientific meetings in Interlaken, Switzerland, and Copenhagen, Denmark. His stay at the Ludwig Institute will extend over a nine-month sabbatical period.

Jeffrey Austman, senior in Agricultural Economics, spent June 2 to July 15 in Brussels, Belgium, working on a research project for Lowell D. Hill, Agricultural Economics. The trip was partially funded by the Study Abroad Program of the College of Agriculture. Austman evaluated the competitiveness of U.S. soybeans in the western European market based on interviews with processors, commodity organization representatives, agricultural attaches, and the EC Commission.

M. Margaret Weigel, Foods and Nutrition, will travel to Quito, Ecuador, from May 22 to August 22. She will conduct field research on the leishmaniasis vaccine and collect data on child survival rates. She will make several presentations on enhancing science and technology in Ecuador. During her stay, she also will meet with the vice-president of Ecuador.

From April 26 to May 1, **Gregory R. Noel**, Plant Pathology, was in Lanzarote, Canary Islands, for the annual meeting of the Organization of Tropical American Nematologists.

Jeffrey O. Dawson, Forestry, spent May 27 to June 7 in Taipei, Taiwan, meeting with scientists at the Taiwan Forest Research Institute.

Poo Chow, Forestry, traveled to Taipei, Taiwan, from May 25 to 28 for the Adhesive Technology for Tropical Woods Symposium. Chow served as a moderator and presented an invited paper. He also traveled to Hong Kong to visit the Building Research Institute.

Xugin J. Lu and **William E. Artz**, Food Science, were in Toronto, Canada, from May 8 to 15 for the annual meeting of the American Oil Chemists' Society. They presented research results and met with scientists from ARCO Company, which is currently sponsoring a research project.

Michael A. Mazzocco, Agricultural Economics, spent June 22 to 27 in Toronto, Canada, for the Conference on Probability and Statistics in Atmospheric Sciences. During May 26 to June 9, Mazzocco also accompanied several student interns to Japan.

Roberto J. Garcia, Agricultural Economics, spent May 16 to 24 in Honduras and Nicaragua as part of a USDA/AID project assessment trade mission.

David A. Lins and **Steven T. Sonka**, Agricultural Economics, were in Cairo, Egypt, from May 24 to June 4 investigating agribusiness education opportunities and managerial

programs with the Principal Bank for Development and Agricultural Development.

Hayri Onal, Agricultural Economics, spent May 2 to 7 in Montreal, Canada, at the scientific conference, "Optimization Days 1992."

Margaret R. Grossman, Agricultural Economics, traveled to Leuven, Belgium, and Wageningen, the Netherlands, from May 12 to June 5. She visited the Catholic University of Leuven as part of the U.S. Information Agency project, "Environmental Policy and the 1992 Integration of Europe." The trip also included meetings with European Community officials in Belgium and attendance at a professional meeting at Wageningen.

From May 28 to June 5, **Robert H. Hornbaker**, Agricultural Economics, was in Lahore, Pakistan, working on a research project with the International Irrigation Management Institute.

Karen L. Bender, Agricultural Economics, spent June 2 to 16 in Brussels, Belgium, collecting grain quality data and investigating test shipment opportunities. **Jeffrey Austman**, Junior in Agricultural Engineering, assisted in this effort as part of his summer internship for the American Soybean Association and the Illinois Department of Agriculture.

Stephen C. Schmidt, Agricultural Economics, traveled to Taipei, Taiwan, and Hong Kong from June 13 to 22 to present new research findings and to collect new data on Hong Kong markets for the USDA.

Harris A. Lewin, Animal Sciences, presented invited lectures at several universities and research institutes in Taiwan during May 30 to June 11.

Robert A. Easter, Animal Sciences, spent May 13 to 16 in San Jose, Costa Rica, presenting invited papers at a symposium sponsored by the American Soybean Association.

George Z. Gertner, Forestry, will spend two months during the summer at the Swiss Federal Institute for Forest, Snow and Landscape Research in Birmensdorf, Switzerland. He will continue work on a project he started two years ago to monitor Swiss forests.

During May 26 to June 5, **Marvin R. Paulson**, Agricultural Engineering, presented a paper on machine vision at the International Conference on Agricultural Engineering in Uppsala, Sweden. He also visited the Swedish Institute of Agricultural Engineering.

Michael E. Irwin, Allan S. Felsot, David W. Onstead, and Kevin L. Steffey, Agricultural Entomology, were in China from June 28 to July 4. They presented invited papers at the International Congress of Entomology in Beijing. For a week following the conference, Irwin also was the guest of the president of the Shandong Province Academy of Agriculture. During his stay, he gave several lectures, exchanged germplasm resistant to pests, and made arrangements for long-term joint programs in soybean integrated pest management. From July 25 to August 1, Irwin will be in Bari, Italy, to present an invited talk at the International Plant Virus Epidemiology Workshop. From August 10 to 14, he will visit the Paris Museum of Natural History to examine type specimens of flies.

Leslie L. Christianson, Agricultural Engineering, will spend July 20 to 28 in Tokyo, Japan, attending the International Symposium on Room Air Convection and Ventilation Effectiveness.

Sandra Brown, Forestry, visited China from May 9 to June 3 to complete a project on forest restoration.

Philip Buriak, Agricultural Engineering, traveled to Russia on May 22 accompanying undergraduate students **Heather Hampton, Brian Stauffer, Curt Strubhar, and John Tamblyn** on an eight-week study abroad and exchange program with St. Petersburg Agricultural State University. Four students from Southern Illinois University-Carbondale were also in the group. **Artur A. Miloyan, Juri L. Barudkin, Elena N. Kartyshova, Denis V. Jakovlev, Elena V. Kchasenevich, Marija E. Kchokchryakova, and Viktor P. Martinov** are the seven students from St. Petersburg who will complete the exchange with a stay at the University of Illinois from June 13 to July 12 and Southern Illinois University-Carbondale from July 12 to August 8. **Charles E. Olson**, Academic Programs, served as campus coordinator for the exchange.

During May, **Sara U. Douglas**, Consumer Sciences, presented a paper in Singapore at an international seminar on the global garment industry.

Duane E. Erickson, Agricultural Economics, traveled to Belize during July 10 to 20 to present an invited paper at the West Indies Agricultural Economics Conference.

John B. Braden, Agricultural Economics, spent June 10 to 19 in Krakow, Poland. Braden held a research planning meeting and attended sessions of the European Association of Environment and Resource Economics.

From August 8 to 15, **Sharon M. Donovan**, Foods and Nutrition, will be in Stockholm, Sweden, for a presentation

at the International Conference on Nutrient Regulation During Pregnancy, Lactation, and Infant Growth.

David H. Baker, Animal Sciences, traveled to Toronto, Canada, from June 5 to 18 to present an invited paper at the Brokyowa Canadian Amino Acid Council meeting.

From August 20 to September 18, **Arthur J. Muehling**, Agricultural Engineering, will be in Poland. During his stay, Muehling will participate in a seminar on environmental and energy aspects of livestock housing.

Steven L. Kohler, Natural History Survey, spent late May in Sweden assisting in a doctoral exam and presenting a lecture at Umea University.

Karen L. Campbell and Iain A. Hall, Veterinary Clinical Medicine, attended the Second World Congress of Veterinary Dermatology in Montreal, Canada, from May 13 to 16. Both presented papers and led workshops.

From July 20 to 27, **Mary Ann L. Smith**, Horticulture, will be in Yokohama, Japan, to attend the International Symposium on Transplant Production Systems.

Bruce Brodie, Veterinary Clinical Medicine, has been awarded a Fulbright Scholarship to teach in Zimbabwe for one year, beginning in September. Brodie will teach herd health to students at the Clinical Veterinary Studies Department, University of Zimbabwe, Harare, Zimbabwe. Brodie will also research Zimbabwean livestock management systems as compared to American ones.

David A. Riecks, Agricultural Communications, visited Sao Paulo, Brazil, from March 30 to May 1 as part of the International Group Study Exchange of the Rotary Foundation. His agenda included presentations and tours of media, health care, educational, and business facilities.

Gordon J. Baker, Veterinary Clinical Medicine, was invited to address the Ontario Equine Veterinary Association during their annual meeting at the University of Guelph, Ontario, Canada, on May 3.

Visiting Scholars

Chen Yi Wu, Chinese Academy of Agricultural Sciences, will be on campus for a year working with Randall L. Nelson, Agronomy, on soybean breeding research. Chen arrived with a shipment of 500 germplasm varieties from the central provinces of China. This major exchange of germplasm resulted from an earlier trip to China by Donald

A. Holt, Experiment Station, Harold E. Kauffman, INTSOY, and four farmers from Iowa and Illinois. The visit and germplasm exchange are funded by the USDA, the Illinois Agricultural Experiment Station, the Iowa Agricultural Experiment Station, the Illinois Soybean Program Operating Board, and the Iowa Soybean Promotion Board.

Fifteen participants from twelve countries attended the INTSOY short course, "Soybean Processing for Food Uses," from June 7 to July 2. Course participants were **Vincent Tekum**, Cameroon; **Su Gang** and **Fu Binxiao**, China; **Nabih Ibrahim**, Egypt; **Isaac M. Kibuthu**, Kenya; **Louis A. Pelembe**, Mozambique; **Louis H. W. Verhoef**, **Dirk Lamprecht**, and **Christain Marais**, Republic of South Africa; **W.S.D.A. Gunasekera** and **Wilfred Kurukulasuriya**, Sri Lanka; **Joyce Kikafunda**, Uganda; **Fred Marmor**, U.S.; **Ciro A. Pryor**, Venezuela; and **Louis A. Uys**, Zimbabwe. **Wilmot B. Wijeratne**, INTSOY, was course coordinator.

Shigeo Yokoyama, Oita Medical University, Japan, will be on campus through March 1993 working with **Fred A. Kummerow**, Food Science, on the influence of tissue culture agents on the growth of cells in tissue.

Alexander Zhivov, visiting scholar from Russia in the Department of Agricultural Engineering, presented a lecture at Malmo, Sweden, during June 12 to 19.

Jonathan Miller, Silsoe College, United Kingdom, will be on campus from June to September working with **Kenneth Konya**, Agricultural Engineering, on ground water quality. His stay is sponsored by the International Association for the Exchange of Students for Technical Experience.

Bartelt Brouer, Kiel, Germany, will spend a year on campus working on soil science with **John W. Hummel**, Agricultural Engineering.

Fifteen Egyptian extension and research professionals arrived July 3 for a short course on extension management and technology transfer. The eleven men and four women are senior administrators from the national agricultural research center and extension service. This five-week training program is being funded by the U.S. Agency for International Development's Egyptian National Agricultural Research Project. **Burton E. Swanson**, INTERPAKS, is director for the course and **Pamela E. Woodard**, International Agriculture, is course coordinator. **Mohamed Samy**, UIUC graduate in agricultural extension, and **Mustafa Mohamed**, UIUC graduate student in extension and rural sociology, provide interpreting and technical support to the course.

Visitors on Campus

On May 6, **Magne Ostera**, GATT Secretariat, Geneva, Switzerland, visited the Department of Agricultural Economics. Ostera presented a talk on agricultural trade in a changing world.

A Korean soybean quality and marketing team was on campus on May 28 and 29. The team included **Jo Say Young**, American Soybean Association; **Lee Woo Bok**, Cheil Foods and Chemicals; and **Chung Moon Hee**, Samyang Oil and Feed Company. During their stay, they met with **Wilmot B. Wijeratne**, **Kukiart Tanteeratarom**, and **Danny R. Erickson**, INTSOY; **Robert J. Wynstra**, International Agriculture; **Richard L. Bernard**, Agronomy; **Lun Shin Wei**, Food Science; and **Darrel L. Good**, **Sarahelen R. Thompson**, **Robert J. Hauser**, and **Karen L. Bender**, Agricultural Economics.

Jill Willows, England, spent May 6 and 7 visiting the Department of Agricultural Economics. Willows is a managing partner of a large farm in Yorkshire, England. As a United Kingdom Nuffield Scholar, she is spending three months visiting universities and farms in the U.S., Canada, and Australia.

Pyotr A. Zakharchenko, Ukraine, visited the College of Agriculture on June 23 as part of a 10-day stay in the U.S. sponsored by the U.S. Feed Grains Council at the recommendation of Secretary of Agriculture **Edward Madigan**. **Zhakharchenko** is director of the Industrial Beef Feeding Complex "25th Party Congress" near Kiev. During his stay, he met with **Robert A. Easter**, Animal Sciences; and **Earl R. Swanson**, Agricultural Economics. His visit on campus was coordinated by **John W. Santas**, International Agriculture.

Gerhard Jahns and **Micheal Graef**, Braunschweig, Germany, were on campus from June 29 to July 3 for discussions with **Leslie L. Christianson**, Agricultural Engineering.

Kishore Kumar, Allahabad University, India; **K. Sridhar Archarya**, editor for *The Prajavani Daily*, India; **M.D. Nalapat**, editor for *The Times of India*, Bangalore, India; and **Hari S. Vasudevan**, Calcutta University, India, spent July 7 meeting with **Errol D. Rodda**, Agricultural Engineering, and **James B. Sinclair**, Plant Pathology. Discussions focused on the University's role in establishing agricultural universities in India during the 1960s and 1970s. The visit was sponsored by the U.S. Information Agency.

Guus Simons, Dutch Dairy Research Institute, Ede, the Netherlands, visited the Department of Food Science from April 26 to May 7. Simons worked with **Bruce M. Chassy**,

Food Science, on collaborative project design. The visit was sponsored by NATO through a collaborators grant.

Mark Posno, TNO Medical Biological Laboratory, Rijswijk, the Netherlands, was on campus on June 1 to present a seminar for the Department of Food Science.

A group from Mexico visited campus on June 12 to discuss the use of soy protein to improve diets in their home country. The group included **Francisco Carrion**, MASECA; **Efren Diaz**, CONASUPO/MICINSA; **Julia Leon**, DIF; and **Armando Camacho**, ALBACHISA/ALADEES. The group was accompanied by **Adela Perez**, American Soybean Association. During their stay, they met with Danny R. Erickson, Wilmot B. Wijeratne, Kuki Tanteeratarom, and Karl E. Weingartner, INTSOY; and Alvin I. Nelson, Food Science.

G. Kaliev, Kazakh Academy of Agricultural Sciences, and **M. Souleimenov**, Grain Research Institute, Kazakhstan, were on campus during April as guests of the Cooperative Extension Service. The pair toured farms, visited agribusinesses, and met with several faculty and staff members. In September, David A. Lins, Agricultural Economics, and David Dimmick, Cooperative Extension Service, will travel to Kazakhstan as guests of the Kazakh Academy of Agricultural Sciences. The exchange was arranged last year during a visit to Kazakhstan by Donald L. Uchtman, Cooperative Extension Service.

Jacques Brossier, French Research Institute, spent June 29 to July 2 discussing water quality issues with faculty and staff from the College of Agriculture. During his stay, Brossier met with John M. Gerber, Horticulture; Michael E. Gray, Agricultural Entomology; John B. Braden, Wesley D. Seitz, and Robert H. Hornbaker, Agricultural Economics; Donald G. Bullock, Robert G. Hoeft, and Ellery L. Knake, Agronomy; Peter D. Bloome, Cooperative Extension Service; John J. Nicholaides III, International Agriculture; and Donald A. Holt, Agricultural Experiment Station.

Asdrubal Arcia, **Francisco Garcia**, and **J. C. Mendible**, National Council for Scientific and Technical Research, Venezuela, spent April 30 and May 1 on campus. During their visit to the College of Agriculture, they met with Robert J. Garcia, Agricultural Economics; and Orville G. Bentley and Thomas A. McCowen, International Agriculture, and they toured the Plant and Animal Biotechnology Building. John W. Santas, International Agriculture, helped coordinate the visit.

Hnia Ben Cheikh, Ministry of Agriculture and Agrarian Reform, Morocco, spent May 15 visiting the College of

Agriculture. She met with Robert G. F. Spitze, Agricultural Economics, and John W. Santas and John J. Nicholaides III, International Agriculture.

Chris A. Onyango, Vice Chancellor for Academic Affairs, Egerton University, Njoro, Kenya, was on campus during June 11 to 15. Prior to arriving on campus, he conducted a meeting of the Egerton University Networking Group at the annual meeting of the Association of International Agriculture and Rural Development in Minneapolis, Minnesota. His visit to UIUC came as part of a series of visits to institutions that are cooperating with Egerton University.

From July 11 to 14, the Office of International Agriculture hosted a delegation from Northwest Frontier Province (NWFP), Pakistan. The delegation included **Abdur Rahman Khan**, Vice Chancellor, NWFP Agricultural University; **Iftikar Ahmed Jhagra**, Minister of Agriculture, NWFP; **Khalid Mansoor**, Secretary of Agriculture, NWFP; and **Abdul Qayyum Khan**, TIPAN project officer. Next the group will visit Southern Illinois University-Carbondale, which is cooperating with UIUC in the TIPAN project. Visits to Purdue University, University of California-Davis, and Colorado State University were also arranged.

During May 21 to 22, **Jajah Koswara**, Director of Research and Community Services, Indonesia, was on campus meeting with John W. Pendleton. She also met with John J. Nicholaides III, International Agriculture; Jack M. Widholm and Gary H. Heichel, Agronomy; and W. R. Gomes, Dean.

Jim Saunders, Development Manager, Victoria College of Agriculture and Horticulture, East Melbourne, Australia, will visit the College of Agriculture on August 28 and 29. He will meet with Lynette L. Marshall, Resource Development, and Charles E. Olson, Academic Programs, for discussions on development programs and potential student exchanges.

From May 7 to 10, three Indian scholars were on campus studying Integrated Pest Management research and extension. The group included **V. T. Sundramurthy**, Central Institute for Cotton Research; **Satya Vir**, Haryana Agricultural University; and **G. C. Tiwari**, Indian Council of Agricultural Research. The group arrived as a part of a reciprocal visit following last year's three-week assessment of IPM in India led by Richard E. Ford, Plant Pathology.

During May 11 to 13, **Glen Hartman**, Asian Vegetable Research and Development Center, Taiwan, visited campus for a special seminar and to meet with faculty and students in the Department of Plant Pathology.

Biotechnology Research

September 15 is the application deadline for grants from the Biotechnology Research and Development Corporation (BDRC), a consortium that funds research projects in plant science, bioprocessing, fermentation, and animal health and production. Research grants for projects from one to three years in length and grants for feasibility studies for preliminary work of up to one year are offered. Applications for funding in areas other than health care should be sent to Dr. J. Michael Gould, Biotechnology Research and Development Corporation, 1815 North University Street, Peoria, Illinois 61604. Applications for funding from the Health Care Division should be sent to James A. Roth, CIEDA, Department of Veterinary Microbiology, Iowa State University, Ames, Iowa 50011.

Jones Foundation Grants

The W. Alton Jones Foundation Sustainable Society program promotes the long-term sustainability of life by preserving the diversity of the world's plant and animal species and the quality of our land, air, and water. A wide range of activities, both national and international, are supported. Proposals are reviewed at quarterly board meetings. More information is available from the W. Alton Jones Foundation, 433 Park Street, Charlottesville, Virginia, 22901; phone: (804)295-2134.

AAUW International Fellowships

December 1 is the next deadline for applications for American Association of University Women (AAUW) international fellowships. Applicants must be women who are not citizens of the United States. They must be engaged in full-time graduate or postgraduate study or research in the United States. Applications, which must be requested at least two weeks before the deadline, are available from AAUW Educational Foundation, 2401 Virginia Avenue, N.W., Washington, D.C. 20037; phone: (202)728-7603.

Global Environmental Program

The Rockefeller Foundation recently unveiled a new grant-making initiative called the Global Environmental Program. The broad purpose is to promote the skills, attitudes, relationships, and institutions necessary for environmentally sound international development. The four areas of interest for grant and fellowship activity are: supporting young environmental scientists, analysts, policymakers, and community leaders who can be architects of future policy in development and the environment; advancing the development of economic analysis to guide and illuminate

the process of environmentally sound development; laying the groundwork for multilateral bargains and accords that will be necessary to address selected environmental issues; and seeking innovative ways to help the U.S. public prepare for new environmental realities. More information on the program and on application procedures is available from the Global Environmental Program, The Rockefeller Foundation; 1133 Avenue of the Americas, New York, New York 10036.

General Service Grants

September 1 and **March 1** are the application deadlines for proposals to the General Service Foundation. The foundation funds projects and programs that promise significant contributions and that are new, innovative, demonstrative, or research-oriented in three areas; international peace, which includes research on the relationships between economic, environmental, and political development and international peace; population, which includes programs that improve maternal and child health, family planning, and agricultural and economic development; and resources, which includes developing food, water, fuel, forage, forest, or fertilizer use on a sustainable basis in developing countries. Grants range from \$5,000 to \$50,000. Some awards are given for research, but for the most part, especially in agriculture, awards are given for hands-on projects. More information is available from the General Services Foundation, 1445 Pearl Street, Suite 201, Boulder, Colorado 80302; phone: (303)447-9541.

Rainforest Alliance Research Fellowships

The Rainforest Alliance supports research initiatives that lead to the environmentally sound utilization of tropical forest resources for the benefit of local forest communities. Currently the Alliance operates two competitive fellowship programs. The Kleinhans Fellowship in Agroforestry Research supports field research to identify methods for sustainable uses of tropical forests for the benefit of local peoples. The Eliane Souza Edelstein Fellowship for Medicinal Plant Research in Brazil supports field research into the sustainable use of medicinal plants as an economic alternative to rainforest destruction. For deadlines and further information, please contact: the Rainforest Alliance, 270 Lafayette Street, Suite 512, New York, New York 10012; phone: (212)941-1900, fax: (212)941-4986.

Changes for IAN

This will be the last issue of the *International Agriculture Newsletter* in this format. Look for a new publication from the Office of International Agriculture this fall.



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